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Bence Lehman

Commissioner of Patents and Trademarks

Margie V. Turner

Attest



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United States Patent [19]

Sainton

[11] Patent Number: **5,761,621**[45] Date of Patent: **Jun. 2, 1998**[54] **APPARATUS AND METHODS FOR NETWORKING OMNI-MODAL RADIO DEVICES**

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Related U.S. Application Data

[63] Continuation of Ser. No. 167,002, Dec. 15, 1993, abandoned.

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[52] U.S. Cl. 455/453; 455/454; 455/552

[58] Field of Search 455/438, 453, 455/454, 517, 524, 552; 379/59, 60

[56] **References Cited****U.S. PATENT DOCUMENTS**

- 4,144,496 · 3/1979 Cunningham et al. 455/54.1
 4,371,751 · 2/1983 Hilligoss, Jr. et al. .
 4,558,453 · 12/1985 Mimken .
 4,578,796 · 3/1986 Charalambous et al. .
 4,741,049 · 4/1988 De Jager et al. .
 4,811,420 · 3/1989 Avis et al. .
 4,833,727 · 5/1989 Calvet et al. .
 4,985,904 · 1/1991 Ogawara .
 5,020,094 · 5/1991 Rash et al. .
 5,077,834 · 12/1991 Andros et al. .
 5,122,795 · 6/1992 Cubley et al. .
 5,127,042 · 6/1992 Gillig et al. 455/33.1 X
 5,134,709 · 7/1992 Bi et al. 455/34.1 X
 5,179,360 · 1/1993 Suzuki 455/86 X
 5,200,991 · 4/1993 Motoyanagi .
 5,201,067 · 4/1993 Grube et al. .
 5,239,701 · 8/1993 Ishii .

- 5,249,302 · 9/1993 Metroka et al. .
 5,261,117 · 11/1993 Olson 455/54.2 X
 5,293,638 · 3/1994 Sasuta et al. 455/34.1 X
 5,343,513 · 8/1994 Kay et al. 455/34.1 X
 5,649,308 · 7/1997 Andrews 455/84

OTHER PUBLICATIONS

- *"Electronic Messaging System (EPS)", Feb. 5, 1993, Complex Architectures, Inc.
 "Motorola Paging & Wireless Data Group", Bob Growney and William Davies, pp. 155 and 156, Portable Computers Wireless Communications, 1993.
 "Racotek", Richard Cortese and Larry Sanders, pp. 176-178, Portable Computers and Wireless Communications, 1993.

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A network and method of operating a network of wireless service providers adapted to interact with a plurality of omni-modal wireless products within a given geographic area in a manner to permit the wireless service providers to "borrow" radio frequencies from other wireless service providers within the same geographic region. As a cellular service provider in a given region finds that one of its service areas or cells has become nearly or fully loaded, frequency could be borrowed from a competitor, such as a PCS provider serving the same region. Selected omni-modal wireless product users in the overloaded area would be told to switch their omni-modal to the "leased" frequency but to use the non-PCS communications protocol appropriate to the type of service desired by the user. Implementation of this method broadly within a given geographic region will have the effect of insuring that the available radio spectrum is used to its maximum capacity to serve the needs of the wireless users on a real time basis.

24 Claims, 16 Drawing Sheets